LM19 · FIXED INCOME · CFA LEVEL I

Mortgage-Backed Security (MBS) Instrument and Market Features

Mortgages, prepayment risk (contraction & extension), pass-throughs, CMOs (PAC, support, Z-bond), and commercial vs residential MBS.

Learning Outcomes

LOS a Describe residential mortgage loans and MBS

LOS b Describe the prepayment risks of MBS and the CMO structures used to reallocate that risk

LOS c Describe commercial mortgage loans and CMBS

Exam Tip: Prepayment risk = Contraction (rates ↓, principal returned faster) + Extension (rates ↑, principal returned slower). PAC tranches have more stable prepayment behavior; support tranches absorb volatility. CMBS are non-recourse with balloon and call protection.

LOS A · RESIDENTIAL MORTGAGE LOANS

Residential Mortgage Loans & RMBS

A residential mortgage loan is a loan secured by residential real estate. Key risk metrics:

- **Loan-to-value (LTV) ratio** — lower LTV = higher equity = lower default risk.
- **Debt-to-income (DTI) ratio** — lower DTI = lower default risk.

Prime loans

Borrowers with good credit, low LTV, low DTI.

Subprime loans

Borrowers with weaker credit, higher LTV / DTI, or lower-priority claim.

Recourse vs non-recourse

- **Recourse** — lender can pursue other borrower assets (common in Europe).
- **Non-recourse** — only the collateral property is at risk (many US states).

Agency vs non-agency RMBS

Agency RMBS — guaranteed by a government (Ginnie Mae) or GSE (Fannie Mae, Freddie Mac). Must meet minimum standards. **Non-agency RMBS** — issued by private entities; no government backing. Issuance effectively stopped after 2007–2009.

LOS B · PREPAYMENT RISK

Prepayment Risk

US residential mortgages have no prepayment penalties — borrowers can refinance freely. RMBS valuations assume prepayment speeds; the two directions of risk are:

Contraction risk

Prepayment faster than expected (when rates **fall**). Principal comes back early; reinvestment at lower rates. Bad for RMBS investors.

Extension risk

Prepayment slower than expected (when rates **rise**). Cash flows discounted at higher rate and for more periods. Bad for RMBS investors.

Prepayments flow from home sales, refinancing, and defaults (for agency RMBS, defaults effectively become prepayments via the guarantee).

LOS B · MORTGAGE PASS-THROUGH SECURITIES

Mortgage Pass-Through Securities

A **pass-through** gives investors a claim on monthly cash flows from a pool of mortgages, net of servicing and insurance fees.

Pool characteristics

- **Weighted average maturity (WAM)** — weighted by outstanding principal.
- **Weighted average coupon (WAC)** — weighted by outstanding principal.
- **Pass-through rate** — coupon on the MBS = WAC – servicing and insurance fees.

CHECKPOINT 1

Quiz 1: Mortgages & Pass-Throughs

Answer all questions to test your understanding. Your score updates on the final step.

Q1. If interest rates fall sharply, RMBS investors *most likely* face:

Q2. The **pass-through rate** of an MBS is equal to:

Q3. A lower loan-to-value ratio on a residential mortgage *most likely*:

Q4. Non-agency RMBS are:

Q5. Extension risk to RMBS investors is:

LOS B · CMOS, TIME TRANCHING, PACS

Collateralized Mortgage Obligations (CMOs)

CMOs are securities collateralized by mortgage pass-throughs. Each CMO has **multiple tranches** with different risk exposures, enabling investors to choose their preferred prepayment profile.

Time tranching (sequential-pay CMO)

Principal payments flow to tranches in a **prespecified order**. The first tranche receives all principal until fully paid; then the second tranche; and so on.

- Short-maturity tranches → more protection against **extension** risk.
- Long-maturity tranches → more protection against **contraction** risk.

PAC (planned amortization class) and support tranches

A **PAC tranche** has a predictable schedule thanks to a **support tranche** that absorbs prepayment volatility on both sides:

- Prepayments faster than expected → excess goes to support.
- Prepayments slower than expected → principal to support is reduced to keep PAC on schedule.

PAC tranches have **reduced contraction AND extension risk**; support tranches take on more.

Z-bond (accrual tranche): receives no cash flows until all prior tranches are paid; interest accrues and is added to principal. Highest prepayment / duration risk.

LOS C · COMMERCIAL MBS

Commercial Mortgage-Backed Securities (CMBS)

CMBS are backed by commercial mortgage loans (office, retail, industrial, multifamily). Loans are **non-recourse** — the investor's recovery is limited to the property itself.

Credit metrics for CMBS loans

- **Loan-to-value (LTV)**
- **Debt service coverage ratio (DSCR)** = NOI / debt service

Structural features

- **Call protection** — limits prepayment (prepayment lockouts, defeasance, yield maintenance, prepayment penalty points).
- **Balloon payment** — most CMBS loans are partially amortizing and have a balloon at maturity.
- **Balloon risk** — refinancing risk at balloon date (a.k.a. extension risk if the loan is extended).

CMBS tranches are **credit-tranched** — junior tranches absorb default losses first. Given non-recourse structure, credit analysis focuses on collateral (LTV, DSCR) and the quality of the property cash flows.

CHECKPOINT 2

Quiz 2: CMOs & CMBS

Answer all questions to test your understanding. Your score updates on the final step.

Q6. A PAC tranche:

Q7. A Z-bond (accrual tranche) has:

Q8. Commercial MBS rely *primarily* on:

Q9. Call protection in CMBS is achieved through:

Q10. Balloon risk in CMBS refers to:

REVIEW · PREPAYMENT DRIVERS

What Drives Residential Prepayments?

- **Interest rates** — falling rates accelerate refinancing (contraction).
- **Turnover** — home sales (moves, life events) produce prepayments.
- **Defaults** — in agency pools, defaults behave like prepayments (guarantee pays par back to investors).
- **Curtailments** — partial early repayments by borrowers.

Key intuition

RMBS have **negative convexity** like callable bonds — price appreciation is capped because falling rates trigger refinancing waves.

CHECKPOINT 3 · SYNTHESIS

Quiz 3: Synthesis

Answer all questions to test your understanding. Your score updates on the final step.

Q11. A PAC tranche protects against:

Q12. Non-agency RMBS issuance effectively ceased after 2007–2009 because:

Q13. Which tranche in a sequential-pay CMO provides the greatest protection against extension risk?

Q14. DSCR on a CMBS property loan of 1.25 means:

Q15. RMBS exhibit **negative convexity** because:

MODULE COMPLETE

Your Scorecard

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LM19 Key Takeaways — Exam-Ready Cheat Sheet

Prepayment risk

Contraction (rates ↓, principal returned faster) · **Extension** (rates ↑, principal returned slower). Both hurt RMBS investors.

CMO structures

Sequential-pay / time tranching · **PAC + support** (PAC stable, support absorbs) · **Z-bond** (accrual).

CMBS

Non-recourse, balloon structure, call protection (lockouts, defeasance, yield maintenance, prepayment points). Credit driven by LTV and DSCR.

Key metrics

RMBS: LTV, DTI, pool WAC & WAM. Pass-through rate = WAC – servicing/insurance. RMBS have **negative convexity**.

Step 1 of 11